USGS
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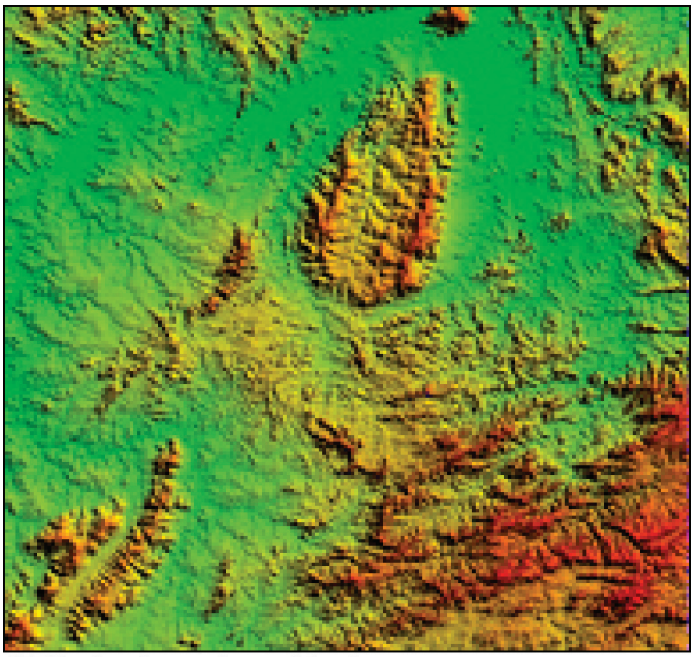
Geography - Land Remote Sensing

Shuttle Radar Topography Mission – New Products in 2005

In February 2000, the Shuttle Radar Topography Mission (SRTM) successfully collected Interferometric C-Band Synthetic Aperture Radar data over 80 percent of the Earth's land surface, for most of the area between 60°N and 56°S latitude. NASA and the National Geospatial-Intelligence Agency (NGA), formerly known as the National Imagery and Mapping Agency (NIMA), co-sponsored the mission.

NASA's Jet Propulsion Laboratory (JPL) performed preliminary processing of SRTM data and forwarded partially finished data directly to NGA for finishing by NGA contractors and subsequent monthly deliveries to the NGA Digital Products Data Warehouse (DPDW). All data products delivered by the contractors conform to NGA SRTM Data Products and NGA Digital Terrain Elevation Data® (DTED®) specifications. The DPDW ingests the SRTM data products, checks them for formatting errors, loads the public SRTM DTED® into the NGA data distribution system, and ships them to the U.S. Geological Survey (USGS) Center for Earth Resources Observation and Science (EROS). In addition to NGA's SRTM DTED® format, USGS EROS has reformatted the data into a non-proprietary, generic raster binary SRTM format that is readable by most remote sensing software packages. The SRTM format is also publicly available from USGS EROS.



SRTM subset image of central Brazil.

Data Processing

SRTM DTED® is a uniform matrix of elevation values indexed to specific points on the ground. The horizontal datum is the World Geodetic System 1984 (WGS 84), and the vertical datum is mean sea level as determined by the WGS 84 / Earth Gravitational Model 1996 (EGM 96) geoid. SRTM DTED® Level 2 elevation values are spaced 1 arc second apart between 0° and 50° latitude, and spaced 1 arc second apart in latitude and 2 arc seconds apart in longitude between 50° and 60° latitude. SRTM DTED® Level 1 values are derived from SRTM DTED® Level 2 values such that the SRTM DTED® Level 1 values are identical to the SRTM DTED® Level 2 values at coincident points. The SRTM DTED® Level 1 values are spaced 3 arc seconds apart between 0° and 50° latitude, and spaced 3 arc seconds apart in latitude and 6 arc seconds apart in longitude between 50° and 60° latitude. NGA performs quality assurance checks on the JPL SRTM data, and its contractors perform several additional finishing steps. Spikes and wells in the data are detected and voided out if they exceed 100 meters (m) compared to surrounding elevations. Small voids of 16 contiguous posts or fewer are filled by interpolation of surrounding elevations. Large voids are left in the data. Water bodies are depicted in the SRTM DTED®. The ocean elevation is set to 0 m. Lakes of 600 m or more in length are flattened and set to a constant height. Rivers that exceed 183 m in width are delineated and monotonically stepped down in height. Islands are depicted if they have a major axis exceeding 300 m or the relief is greater than 15 m. The data are processed in 1° x 1° "cells." The edges of each cell are matched with the edges of adjacent cells to ensure continuity.

SRTM DTED® elevations are representative of the reflective surface. Some of the data may exhibit typical radar artifacts, including scattered voids due to shadowing effects and poor signal returns over some terrain, as well as occasional phase unwrapping errors. However, overall, the data are 95 percent complete over the collection area, and the SRTM DTED® absolute height accuracy is significantly better than the 16-m (90 percent confidence) specification for the mission.

Ordering 3-Arc Second SRTM Data

An SRTM 13-area grid system has been developed for ordering 3-arc second (90-m) data (Figure 1). Within this system, each area represents one DVD of elevation data. By selecting a numbered area, a customer may view more closely the 1° x 1° cells contained within that grid area.

Customers may search and order 3-arc second (90-m) DTED® formatted data from http://edcsns17.cr.usgs.gov/srtmdted/

Customers may search and order 3-arc second (90-m) SRTM formatted data from http://edcsns17.cr.usgs.gov/srtmbil/

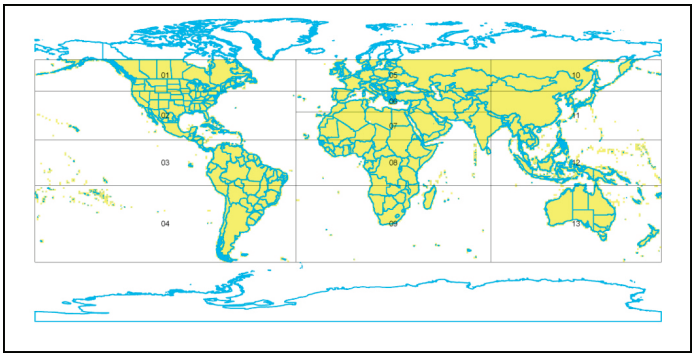


Figure 1. Grid system used for ordering 3-arc second (90-m) data. Each area represents one DVD of elevation data.

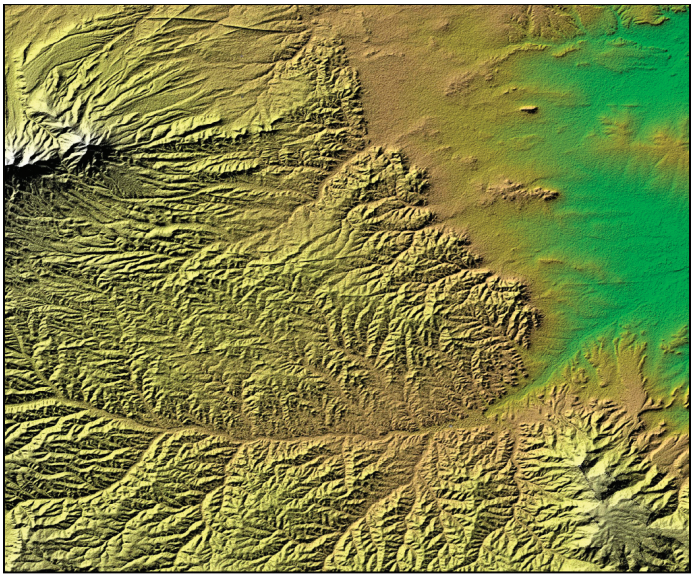
Ordering 1-Arc Second SRTM Data

Customers may order 1-arc second (30-m) SRTM data of the United States and territorial islands by using a 7-area grid system (Figure 2). Within this system, each area represents one DVD of elevation data. Currently, data are available for the United States and its territories, except for cells along the Canadian and Mexican borders that require masking. USGS EROS is the contact for 30-m data of the United States.

By selecting a numbered area, a customer may view more closely the 1° x 1° cells contained within that grid area. Orders may also be requested in this view.

Customers may search and order 1-arc second (30-m) DTED® data from http://edcsns17.cr.usgs.gov/srtmdted2

Customers may search and order 1-arc second (30-m) SRTM formatted data from http://edcsns17.cr.usgs.gov/srtmbil2



SRTM subset image of southern Colorado using 1-arc second data.

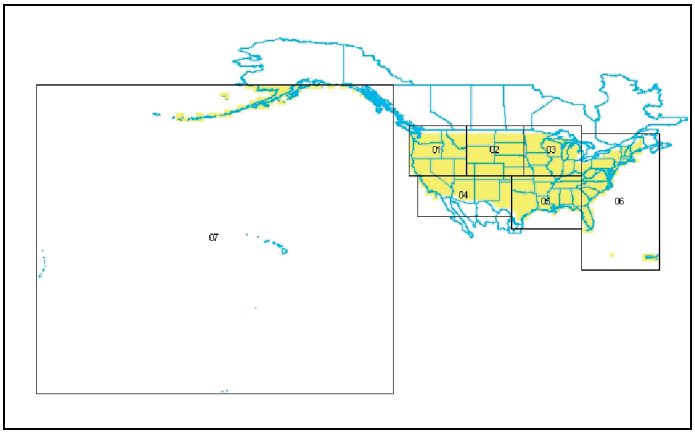


Figure 2. Grid system used for ordering 1-arc second (30-m) data. Each area represents one DVD of elevation data.

For More Information

For information on SRTM and radar interferometry, visit NASA's website at http://www2.jpl.nasa.gov/srtm/

For additional information on SRTM data and ordering procedures, visit http://srtm.usgs.gov/ or contact:

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